UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,344	01/31/2001	John T. McDevitt	5119-00525	7208

7590 04/05/2005

ERIC B. MEYERTONS
CONLEY, ROSE & TAYON, P.C.
P.O. BOX 398
AUSTIN, TX 78767-0398

EXAMINER	
LUM, LEON YUN BON	
ART UNIT	**PAPER NUMBER**
1641	

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/775,344	MCDEVITT ET AL.	
	Examiner	Art Unit	
	Leon Y. Lum	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *309,460-481,483-485,489-494 and 496* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *309,460-481,483-485,489-494 and 496* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed 13 January 2005 is acknowledged and has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 467 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 467, lines 3-4, the phrase "reduces the likelihood that a particle positioned within a cavity is dislodged from the cavity" is vague and indefinite. The specification does not provide a definition for the phrase and it is unclear whether the particle is dislodged or not. By simply "reducing the likelihood", the phrase does not indicate whether the particle stays within the cavity or is dislodged, which renders the phrase indefinite.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 309, 460, 463-464, 467-469, 470, 472, 474, 477-479, 481-482, 485, and 491-493 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lavigne et al (J. Am. Chem. Soc. 1998, 120: 6429-6430) in view of Kricka et al (US 5,296,375), and in light of Bogart et al (US 5,541,057).

In the instant claims, Lavigne et al reference teaches an "electronic tongue" device wherein a light source irradiates a series of beads held in pits (i.e. sensor array comprising a supporting member comprising at least one cavity; particle positioned within a cavity) through a cover plate, wherein the transmitted light is analyzed with a CCD array (i.e. detector; light source and detector are positioned such that light passes from the light source, to the particle, and onto the detector), wherein the beads are poly(ethylene glycol)-polystyrene (PEG-PS) resin beads that were derivatized with a variety of indicator molecules (i.e. particle comprises a receptor molecule coupled to a polymeric resin), and wherein the indicators are selective for individual analytes (i.e. particle interacts with the analyte in bodily fluid). See page 6429, left column, 3rd paragraph, lines 6-10; and Figure 1C and caption.

However, Lavigne et al reference fails to teach a fluid delivery system, the fluid delivery system being incorporated into the supporting member, and wherein the fluid delivery system is configured to deliver fluid to the particle positioned within the cavity.

Kricka et al reference teaches a solid substrate with flow channels 20 (i.e. fluid delivery system in supporting member) leading to detection chambers 40A, 40B, and 40C (i.e. deliver fluid to cavity), in order to provide each detection chamber with the same sample applied at inlet port 16A. In addition, Kricka et al reference teaches that each detection chamber includes antibodies selective for different antigens in a biological fluid sample. See column 10, Example 3, lines 23-38; and Figure 9.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Lavigne et al with a solid substrate with flow

channels 20 (i.e. fluid delivery system in supporting member) leading to detection chambers 40A, 40B, and 40C that include (i.e. deliver fluid to cavity), as taught by Kricka et al, in order to provide each detection chamber with the same sample applied at inlet port 16A. One of ordinary skill in the art at the time of the invention would have had reasonable expectation of success in including flow channels on a solid substrate with detection chambers, as taught by Kricka et al, in the apparatus of Lavigne et al, since both Kricka et al and Lavigne et al teach a substrate with regions that include capture agents that bind to analytes in fluid. Kricka et al teach a sensor substrate with wells comprising indicators selective for multiple analytes in solution, and Lavigne et al teaches detection chambers with antibodies selective for different antigens in a biological fluid sample.

With regards to claims 460 and 474, Lavigne et al reference teaches that a 3 x 3 array of beads was created, wherein resin beads are positioned within micromachined wells formed in Si/SiN wafers (i.e. positioning a plurality of populations of particles within a plurality of cavities; silicon wafer), thus confining the beads to individually addressable positions on a multicomponent chip, wherein a 3 x 3 array of beads was created to simultaneously identify a variety of analytes (i.e. adapted to detect a plurality of analytes in a bodily fluid, wherein the analyte that is detected by a population of particles is not detect by a different population of particles). See page 6429, right column, 1st paragraph, lines 2-9; and Figure 1B.

With regards to claims 463-464 and 493, Lavigne et al reference teaches that data streams composed of red, green, and blue (RGB) light intensities were acquired for

each of the individual beads (i.e. red, green, and blue light source), and that color attenuation was recorded for red, green, and blue with the CCD (i.e. detect independently the absorbance of red, green, and blue light; spectroscopic change). See page 6429, right column, 1st paragraph, lines 14-16; Figure 1C and caption; and Figure 2 and caption.

With regards to claim 467, Lavigne et al reference teaches a cover layer, as stated above (i.e. a cover layer positioned above the supporting member at a height). Since a cover plate is generally known to one of ordinary skill in the art as an embodiment that is placed over a surface, and Figure 1 indicates a cover plate (ii) that appears to be placed over the substrate (iii) at a distance that is less than the diameter of the bead shown, the cover plate would necessarily hold the bead in place (i.e. reduces the likelihood that a particle positioned within a cavity is dislodged from the cavity). See Figure 1 and caption.

With regards to claims 468-469, Lavigne et al reference teaches identifying analytes in solution and also teaches pits (iii), as stated above. See page 6429, left column, 3rd paragraph; Figure 1C and caption.

With regards to claim 470, Kricka et al reference teaches channels that lead past the detection chambers to wells 16B-D (i.e. channels are configured to allow the fluid to flow through the channels into and away from the cavity). See Figure 9.

With regards to claim 472, Lavigne et al reference teaches that the bottom of the pits is where light is transmitted to a CCD array (i.e. sensing cavity). See Figure 1 and caption.

With regards to claim 477, Lavigne et al reference teaches that micromachined wells are formed in Si/SiN wafers (i.e. inner surface of the cavity is coated with a reflective material), as stated above. See page 6429, right column, 1st paragraph, lines 2-3. Although Lavigne et al reference does not explicitly teach that the wells are reflective, silicon wafers are inherently reflective, as taught by Bogart et al reference in disclosing that silicon wafer is a polished reflective material. See column 44, lines 43-44.

With regards to claims 478-479, Lavigne et al reference teaches a CCD array (i.e. charged-couple device; detector is coupled to the sensor array), as stated above. See page 6430, Figure 1C and caption.

With regards to claims 481, Lavigne et al reference teaches that responses were recorded with one specific and three nonspecific sensors, wherein the sensors are fluorescein, wherein signal transduction was accomplished by analysis of the absorption properties of the beads using a CCD See page 6429, right column , 1st paragraph, lines 9-11; right column, 2nd paragraph, lines 1-3; and Figure 1C. Since detection is performed on beads using a CCD and the beads are tagged with sensors that are fluorescein, it is inherent that the CCD is required to be a fluorescence detector.

With regards to claim 485, Lavigne et al reference teaches that a resin bound boronic acid (1) was saturated with a fluorescently tagged sugar, resorufin-β-D-galactopyranoside (2), wherein the addition of D-fructose, which has a higher affinity than 2 for the boronic acid, results in a displacement of 2 and upon washing the released tag away from the resin, there is colorimetric modulation (i.e. particle further

comprises an indicator, wherein the indicator is associated with the receptor such that in the presence of the analyte the indicator is displaced from the receptor to produce the signal). See page 6429, right column, 8th paragraph, lines 1-5.

With regards to claims 491-492, Lavigne et al reference teaches that the size of the wells was chosen so that they hold the beads in swollen and unswollen states, wherein swelling volumes of beads with a wet diameter of 250 μm are on the order of 4 times the dry diameter of 210 μm (i.e. particle ranges from about 0.05 microns to about 500 microns; particle changes when contacted with the fluid). See page 6329, right column; 1st paragraph, lines 5-6; and 5th paragraph, lines 2-5.

8. Claims 461, 466, 471, 473, 490, and 494 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lavigne et al (J. Am. Chem. Soc. 1998, 120: 6429-6430) in view of Kricka et al (US 5,296,375), as applied to claim 309 above, and further in view of Pfost et al (US 6,485,690 B1).

Lavigne et al and Kricka et al references have been disclosed above, but fail to teach that the cover layer is positioned such that a channel is formed between an upper surface of the supporting member and the cover layer such that the fluid passes through the channel (claim 471).

Pfost et al reference teaches a center distribution layer that comprises a plurality of channels that form a delivery system, in order to convey, transport, and process samples in a large multiplicity of sites without exposure to the atmosphere. See column 2, lines 25-30 and 49-64. Pfost et al reference also teaches that the center distribution

layer can be made of plastic and that any of the layers in the processor can incorporate optical elements. See column 6, lines 33-41; column 11, lines 41-55; and Figure 9

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Lavigne et al and Kricka et al, with a center distribution layer that comprises a plurality of channels that form a delivery system, as taught by Pfost et al, in order to convey, transport, and process samples in a large multiplicity of sites without exposure to the atmosphere. One of ordinary skill in the art at the time of the invention would have reasonable expectation of success in including the upper reservoir and center distribution layers as a cover layer in the device of Lavigne et al and Kricka et al, since Lavigne et al and Kricka et al teach a cover layer on a supporting member with a plurality of wells, and the center distribution layer taught by Pfost is designed to provide sample distribution to a plurality of sites in a supporting member. In addition, the cover layers of Lavigne et al and Kricka et al, and Pfost et al references can allow optical detection means.

With regards to claim 461, Pfost et al reference teaches that one or more microbeads 31 may be positioned in the reaction well 30' for solid phase chemistry applications (i.e. the system comprises a plurality of particles positioned within a cavity). See column 7, lines 57-58 and Figures 10-18.

With regards to claim 466, Pfost et al reference teaches a detachable bottom layer or plate that includes a plurality of submicrotiter reaction wells (i.e. cover layer is removable), in order to remove the bottom plate for incubation. See column 2, lines 65-67 and column 3, lines 1-3.

With regards to claim 473, Pfost et al reference teaches that the plates 12, 14, and 16 (i.e. supporting member) can be made from any desirable material such as plastics (i.e. supporting member comprises a silicon wafer), as stated above, in order for the micro-sized reservoirs, channels, and reaction cells to be controllably etched or otherwise formed onto the plates using semiconductor fabrication techniques with a suitable chemical or laser etchant. See column 6, lines 33-41; and Figure 9.

With regards to claim 490, Pfost et al reference teaches reagent reservoirs in an upper layer above the center distribution layer (i.e. reagent reservoir and wherein fluid passes through a reagent reservoir prior to passing over the sensor array). See column 5, lines 57-61 and Figure 9.

With regards to claim 494, Pfost et al reference teaches that a pressure pumping mechanism, or a vacuum system is used (i.e. a vacuum chamber coupled to a conduit and the sensor array, and wherein the chamber is configured to provide a pulling force on the fluid in the sensor array), in order to assist in loading and distributing the reagents and other materials within the layers, to assist in draining and evacuation of excess reagents and wash solvents, and to fill or empty the microchannels and wells. See column 6, lines 47-53 and column 8, lines 20-22.

9. Claim 462 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lavigne et al (J. Am. Chem. Soc. 1998, 120: 6429-6430) in view of Kricka et al (US 5,296,375), as applied to claim 309 above, and further in view of Stabile et al (US 5,854,684).

Lavigne et al and Kricka et al references have been disclosed above, but fail to teach that the light source comprises a light emitting diode.

Stabile et al reference teaches LEDs with relatively closely spaced light emitters, in order to have the advantages in cost and simplicity of housing requirements. See column 11, lines 65-67 and column 12, lines 1-5.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Lavigne et al and Kricka et al, with LEDs with relatively closely spaced light emitters, as taught by Stabile et al, in order to have the advantages in cost and simplicity of housing requirements. One of ordinary skill in the art at the time of the invention would have reasonable expectation of success in including an LED in the device of Lavigne et al and Kricka et al, since Lavigne et al and Kricka et al teach a light source, and an LED is one type of light source.

10. Claim 465 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lavigne et al (J. Am. Chem. Soc. 1998, 120: 6429-6430) in view of Kricka et al (US 5,296,375), as applied to claim 309 above, and further in view of Weersink et al (US 6,219,566 B1).

Lavigne et al and Kricka et al references have been disclosed above, but fail to teach that the light source comprises a white light source.

Weersink et al reference teaches that the light source 14 may be a white light lamp source, wherein the signal output is detected by a charge coupled device (CCD)

detector, in order to excite a fluorophore in turbid medium. See column 6, lines 22-39, especially lines 27-29, 32-33, and 37-38; and Figure 2.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Lavigne et al and Kricka et al, with a white light lamp source, wherein the signal output is detected by a charge coupled device (CCD) detector, as taught by Weersink et al, in order to excite a fluorophore in turbid medium. One of ordinary skill in the art at the time of the invention would have reasonable expectation of success in using a white light source, as taught by Weersink et al, in the device of Lavigne et al and Kricka et al, since Lavigne et al and Kricka et al teach a light source capable of producing light at a plurality of wavelengths, wherein the light is transmitted through a liquid and detected by a CCD, and the white light source taught by Weersink et al produces one type of wavelength that is also transmitted through a liquid medium and detectable by a CCD.

11. Claims 475-476 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lavigne et al (J. Am. Chem. Soc. 1998, 120: 6429-6430) in view of Kricka et al (US 5,296,375), as applied to claim 309 above, and further in view of Zanzucchi et al (US 5,681,484).

Lavigne et al and Kricka et al references have been disclosed above, but fail to teach that the supporting member comprises a plurality of layers of a dry film photoresist material.

Zanzucchi et al reference teaches a first and second photoresist layer, in order to form channels in a substrate. See column 3, lines 11-27.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Lavigne et al and Kricka et al with a first and second photoresist layer, as taught by Zanzucchi et al, in order to form channels in a substrate. One of ordinary skill in the art at the time of the invention would have reasonable expectation of success in including photoresist layers, as taught by Zanzucchi et al, in the device of Lavigne et al and Kricka et al, since Lavigne et al and Kricka et al teach micromachined wells in a substrate for microscale assays, and the photoresist layers taught by Zanzucchi et al are used to etch channels in substrates for a microfluidic assay.

12. Claim 480 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lavigne et al (J. Am. Chem. Soc. 1998, 120: 6429-6430) in view of Kricka et al (US 5,296,375), as applied to claim 309 above, and further in view of Walt et al (US 6,023,540).

Lavigne et al and Kricka et al references have been disclosed above, but fail to teach that the detector comprises an ultraviolet detector.

Walt et al reference teaches fiber optic strands using ultraviolet wavelengths in combination with the absorption coefficient, in order to determine the concentration of specific analytes of interest by spectral measurement. See column 2, lines 22-26.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Lavigne et al and Kricka et al with fiber optic strands using ultraviolet wavelengths in combination with the absorption coefficient, as taught by Walt et al, in order to determine the concentration of specific analytes of interest by spectral measurement. One of ordinary skill in the art at the time of the invention would have reasonable expectation of success in including a fiber optic strand using ultraviolet wavelengths, as taught by Walt et al, in the device of Lavigne et al and Kricka et al, since Lavigne et al and Kricka et al teach a detection system that can detect a multitude of wavelengths, and ultraviolet wavelength is one type of wavelength.

13. Claim 483 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lavigne et al (J. Am. Chem. Soc. 1998, 120: 6429-6430) in view of Kricka et al (US 5,296,375), as applied to claim 309 above, and further in view of Barany et al (US 5,235,028).

Lavigne et al and Kricka et al references have been disclosed above and Lavigne et al additionally teaches poly(ethylene glycol)-polystyrene (PEG-PS) resin beads. See page 6429, left column, 3rd paragraph, lines 6-7. However, Lavigne et al and Kricka et al fail to teach that the polymeric resin comprises polystyrene-polyethylene glycol-divinyl benzene.

Barany et al reference teaches that a particularly preferred support is an amino-functionalized polystyrene-co-1% divinylbenzene, wherein most of the amino groups become substituted with polyethylene glycol derivatives, in order to produce PEG-PS

supports that have the desirable characteristic of being able to swell in a variety of solvents. See column 5, lines 27-35; and column 6, lines 48-51.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Lavigne et al and Kricka et al with an amino-functionalized polystyrene-co-1% divinylbenzene, wherein most of the amino groups become substituted with polyethylene glycol derivatives, as taught by Barany et al, in order to produce PEG-PS supports that have the desirable characteristic of being able to swell in a variety of solvents. One of ordinary skill in the art at the time of the invention would have reasonable expectation of success in including a PEG-PS-divinyl benzene resin, as taught by Barany et al, in the device of Lavigne et al and Kricka et al, since Lavigne et al and Kricka et al teach PEG-PS resin beads, and PEG-PS beads derivatized with divinyl benzene is one type of PEG-PS support.

14. Claims 484 and 496 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lavigne et al (J. Am. Chem. Soc. 1998, 120: 6429-6430) in view of Kricka et al (US 5,296,375), as applied to claim 309 above, and further in view of Chandler et al (US 6,268,222 B1).

Lavigne et al and Kricka et al references have been disclosed above, but fail to teach that the particle further comprises a first indicator and a second indicator, the first and second indicators being coupled to the receptor, wherein an interaction of the receptor with the analyte causes the first and second indicators to interact such that the signal is produced; wherein the particle comprises a biopolymer coupled to the

polymeric resin, and wherein the biopolymer undergoes a chemical reaction in the presence of the analyte to produce a signal.

Chandler et al reference teaches a fluorescent polymeric article, comprising a carrier microparticle carrying one or more nanoparticles with multiple fluorescent signals, wherein each such population of microparticles, characterized by at least two fluorescent signals, is combined with an analytical reactant capable of binding a specific analyte of interest in a clinical or test sample, wherein the dyes have the same or overlapping excitation spectra, but possess distinguishable emission spectra, wherein beads are formed from natural macromolecules and nanoparticles are preferably made of the same material as microparticles, and wherein the polymeric article can produce hybridization in nucleic acid assays with a product of the label, in order to detect various analytes of interest in various types of analyte assays such as immunoassays, nucleic acid assays, affinity purification, and other medical, diagnostic, and industrial applications. See column 6, lines 57-60; column 7, lines 12-13; column 9, lines 41-44; column 12, lines 6-9, 36-39, and 58-67; and column 16, lines 13-19.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Lavigne et al and Kricka et al with a fluorescent polymeric article, comprising a carrier microparticle carrying one or more nanoparticles with multiple fluorescent signals, wherein each such population of microparticles, characterized by at least two fluorescent signals, is combined with an analytical reactant capable of binding a specific analyte of interest in a clinical or test sample, wherein the dyes have the same or overlapping excitation spectra, but possess distinguishable

emission spectra, wherein beads are formed from natural macromolecules and nanoparticles are preferably made of the same material as microparticles, and wherein the polymeric article can produce hybridization in nucleic acid assays with a product of the label, as taught by Chandler et al, in order to detect various analytes of interest in various types of analyte assays such as immunoassays, nucleic acid assays, affinity purification, and other medical, diagnostic, and industrial applications. One of ordinary skill in the art at the time of the invention would have reasonable expectation of success in including the fluorescent polymeric articles, as taught by Chandler et al, in the device of Lavigne et al and Kricka et al, since Lavigne et al and Kricka et al teach the application of tagged beads in assays to determine the presence of an analyte, and the multiple-tagged polymeric articles of Chandler et al are capable of performing diagnostic assays to determine a plurality of analyte types.

15. Claim 489 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lavigne et al (J. Am. Chem. Soc. 1998, 120: 6429-6430) in view of Kricka et al (US 5,296,375), as applied to claim 309 above, and further in view of Fernwood et al (US 4,493,815).

Lavigne et al, Kricka et al, and Pfost et al references have been disclosed, but fail to teach a filter coupled to the fluid delivery system, wherein the system is configured such that the fluid passes through a filter prior to passing over the sensor array.

Fernwood et al reference teaches a microporous membrane 3 that is placed immediately below the upper template, in order to immobilize a biochemical species, including antigens, antibodies, conjugates, blocking agents, cells, precipitates, and others, wherein the immobilization effectively filters particulates and allows non-immobilized components to travel down to the lower template 5. See column 3, lines 1-2 and 49-53; and Figure 1.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Lavigne et al, Kricka et al, and Pfost et al, with a microporous membrane 3 that is placed immediately below the upper template, as taught by Fernwood et al, in order to immobilize a biochemical species, including antigens, antibodies, conjugates, blocking agents, cells, precipitates, and others, wherein the immobilization effectively filters particulates and allows non-immobilized components to travel down to the lower template 5. One of ordinary skill in the art would have reasonable expectation of success in including a membrane, as taught by Fernwood et al, in the device of Lavigne et al, Kricka et al, and Pfost et al, since Lavigne et al, Kricka et al, and Pfost et al teach a device with a plurality of wells in an array fashion and includes embodiments that would facilitate appropriate placement of the membrane in the device, which is designed to be placed in a device that accommodates an array of cavities. Since the membrane is capable of being placed under the upper template, as taught by Fernwood et al, it would be placed under the upper layer of Lavigne et al, Kricka et al, and Pfost et al device, and in direct contact with the fluid delivery system of Pfost et al reference.

Response to Arguments

16. On page 9 of the Response/Arguments, Applicants indicate that claims 486-488 and 495 have been cancelled. However, Applicants also indicate that claims 309, 460-465, 468-481, 483-485, 489-494, and 496 are pending in the case, which excludes claims 466-467 and 482. The claim listing in the amendment identifies claims 466-467 as "currently amended" and claim 482 as "cancelled". For the instant Office Action, claims 466-467 will be considered as pending and claim 482 will be considered as cancelled, as directed by the claim listing. However, Applicant is requested to confirm the correct status of claims 466-467 and 482.

17. On page 9 or the Response/Arguments, Applicant requests confirmation of receipt of references D1-D83 as listed on the IDS filed 23 April 2002. The references have been received and the previous objection to the IDS has been withdrawn.

18. The Declaration as noted on pages 9-10 of the Response/Arguments has been received and the previous objection to the Oath/Declaration has been withdrawn.

19. With regards to page 10 of the Response/Arguments, it is noted that Applicants have amended claims 482-485 to overcome the objection that the phrase "the particle

comprises a receptor molecule coupled to a polymeric resin" does not further limit the parent claim.

20. Applicant's arguments, see page 10 of the Response/Arguments, with respect to claim 469 have been fully considered and are persuasive. The objection of claim 469 has been withdrawn. Specifically, Applicants note that claims 468 and 469 each depend on claim 309 and claim 469 therefore does not include a repeated limitation.

21. On pages 10-11 of the Response/Arguments, it is noted that Applicants have cancelled claims 487-488.

22. With regards to page 11 of the Response/Arguments, it is noted that Applicants have amended claims 309, 467-469, 471 to overcome the 35 USC 112, second paragraph rejections made in the previous Office Action.

23. Applicant's arguments, see pages 12-14 of the Response/Arguments, with respect to claim 484 have been fully considered and are persuasive. The rejection of claim 484 based on 35 USC 112, second paragraph has been withdrawn.

24. On page 14 of the Response/Arguments, it is noted that Applicants have cancelled claim 495.

25. With regards to pages 14-15 of the Response/Arguments, it is noted that Applicants have amended claims 460, 467, and 469 to overcome the 35 USC 112, second paragraph rejections made in the previous Office Action.

26. Applicant's arguments with respect to claims 309, 460-461, 463-464, 466-474, 477-479, 481-482, 485-487, 490-495 on pages 25 have been considered but are moot in view of the new ground(s) of rejection and the cancellation of claims 495, 482, and 486-487.

Specifically, Applicants contend on page 17, 6th paragraph, that, with respect to claims 309, 460, 463-464, 467-469, 472, 474, 477-479, 481-482, 485, 491-493, and 495 Lavigne et al 'do not teach the feature of "a fluid delivery system, the fluid delivery system being incorporated into the supporting member" in combination with the other features of claim 309'. In addition, Applicants contend on page 20, last paragraph to page 21, 1st paragraph, that, with respect to claims 461, 466, 470-471, 473, 486-487, 490, and 494, the combination of Lavigne et al and Pfost et al fail to teach the 'features of "a fluid delivery system, the fluid delivery system being incorporated into the supporting member; and a detector, the detector being configured to detect the signal produced by the interaction of the analyte with the particle; wherein the fluid delivery system is configured to deliver fluid to the particle positioned within the cavity; and wherein the light source and detector are positioned such that light passes from the light source, to the particle, and onto the detector."' Since Applicant amended independent claim 309 with the addition of the limitation "a fluid delivery system, the fluid delivery

system being incorporated into the supporting member", Kricka et al reference was applied in combination with Lavigne et al reference to reject the instant claims under 35 USC 103(a), thereby providing new grounds of rejection that renders Applicant's arguments moot.

27. With regards to claims 467-469, Applicant contends on page 18 of the Remarks that there is "no explicit or implicit teaching in Lavigne that specify positioning a cover layer at a fixed height above the supporting member, or that positioning the cover layer at said height would inhibit dislodgement of particles residing in a cavity."

Applicant's arguments have been fully considered but they are not persuasive. As stated in the previous Office Action and in the 35 USC 103 rejection supra, Lavigne reference provides a depiction in the form of Figure 1 of a cover layer over a substrate comprising a bead in a well, which indicates that the bead diameter is larger than the distance between the cover and well substrate, thereby indicating that the bead would not be moved due to the presence of the cover. In addition, Applicant has not supported the argument above with evidence that the cover of Figure 1 would not inhibit dislodgement of the bead, thereby providing an unsubstantiated contention that is not persuasive.

28. With regards to claim 477, Applicant contends on page 19 of the Remarks that "the Examiner appears to rely on a combination of references to each the features of

claim 477" and that "Applicant respectfully reminds the Examiner that a 35 U.S.C. 102 rejection based upon a combination of references is improper".

Applicant's arguments have been fully considered but they are not persuasive. As indicated in the previous Office Action and in the 35 USC 103 rejection supra, Lavigne et al reference is relied upon to teach the limitation of the "reflective material" in claim 477, by disclosing a silicon wafer. However, although silicon wafer is inherently reflective, Lavigne et al reference does not explicitly provide this disclosure and Bogart et al reference is supplied simply to provide teaching of the reflectiveness of silicon wafer. Therefore, Bogart et al reference is not combined with Lavigne et al reference to provide a 35 USC 103 rejection, but simply to provide information that is inherent in the teachings of Lavigne et al.

29. With regards to pages 25-26, Applicant's indication of submission of terminal disclaimers are noted.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Y. Lum whose telephone number is (571) 272-2878. The examiner can normally be reached on weekdays from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Leon Y Lum
Patent Examiner
Art Unit 1641

LYL

LONG V. LE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600
04/01/05